Zagi-ZG Assembly Manual

Airfoil          Zagi 102.4  
Flying weight    24.5 oz   
Wing span        48"        
Wing area        2.8 sq ft 
Wing loading     8.75 oz sq ft
Servos           Micro (not included) 
Radio            w/mixer (not included) 
Model            Zagi ZGI and Zagi ZGO
Read the entire manual before beginning construction!

Read the Li-poly safe handling instructions on pages 21 and 22 before using the battery pack.

Never try to run any brushless motor while hand holding it. Even without a prop, the torque can jerk the motor out of your grip, spin the wires and short out the battery. To avoid bodily injury or damage to the electronics do not plug the motor into the speed control or install the prop on the motor until it is bolted to the motor mount and glued to the plywood spar and all of the installation steps have been followed.

Do not use the motor to cycle batteries. Do not run the motor over 30 seconds while holding the airplane in your hand. The battery, motor and ESC are high performance electronics and require air flow for cooling. The pusher configuration does not provide prop wash for cooling.

This manual contains instructions for two versions of the Ziji: the inrunner and the outrunner motor configurations. Pages 6-7 are the inrunner pages and 7-8 are the outrunner pages.

The Ziji is not a combat or bungie launch airplane. The design objectives were to make a rugged, fast, light weight, aerobatic electric flying wing. The Ziji is not recommended for beginners.

The target weight for the Ziji is 24.5 oz. The airplane is designed to balance at 8” measured back from the nose. In order to achieve these two objectives, the Ziji Brushless motors, micro servos, and a 2500 mAh 3 cell Li-Po battery pack. Any modifications, reinforcements or substitutions not described in this manual must be considered carefully to maintain the correct weight and balance.

A separate battery is not required for the receiver and servos. They are powered by the 3 cell Li-Po battery through the Electronic Speed Control (ESC) which contains the Battery Elimination Circuit (BEC). When the motor drains the battery to a certain level the low voltage cut-off will turn the motor off leaving sufficient power to control the plane long enough for a landing. The auto cutoff in the Zagi 25 and 35 ESC is factory programmed to work with any 3 cell 11.1v Li-Po battery pack.

3M Super 77 or 87 Spray Adhesives are the recommended adhesives for assembly. 3M #77 Spray Adhesive (#77) will not dissolve EPP foam when it is sprayed with a heavy coat or at close range. If a substitute adhesive is selected, test spray a piece of scrap foam before spraying the cores. Epoxy, Shoe Goo or Goop adhesives are not recommended for assembly. Although they both work with EPP foam, they are unnecessarily heavy.

An extra roll of poly tape in a contrasting color is recommended for visual orientation in flight (not included in kit.) It is best to cover the top with a light color and the bottom dark. Trick R/C did not test nor do we recommend any covering materials such as UltraCote, MonoKote, Solarfilm, or any other iron-on materials. If an alternate covering material is chosen, test a patch on the beds first. The wing geometry can be changed by uneven heating and shrinkage of iron-on heat shrink coverings.

Tools and materials needed:

Optional: a second roll of contrasting color poly tape
Sanding block
80 ro 120 grit sandpaper
X-Acto knife or Dermmel
3M Super 77 or 87 Spray Adhesive

Longnose pliers
Wire cutters
masking tape
weights 1 to 5 pounds
There are three parts to each wing panel. The top of the wing can be identified by its greater curvature. The right wing is the wing that would be on your right if you were in the cockpit. The right and left panels can be identified by the color mark at the root (the big end of the wing panel,) red on the right.

**DO NOT REMOVE ANY PRE-CUT PARTS AT THIS TIME!**

There are four important pre-cut features on the wing panels. The battery bay and plywood spar channel are die-cut. These come out as an assembly after joining the wing panels. The servo bays are also die-cut. They are hard to see on the wing cores. An easy way to find them is to rub the surface just ahead of the plywood spar channel.

Leave the prop cut out expander in place for the inrunner version of the Zijji. The prop cutout expander is only removed to provide prop clearance for the longer prop on the outrunner version of the Zijji.

The four carbon fiber spar channels extend the full length of both wing panels on both sides.
Set the wing cores on the beds and blocksand the wing panels (cores) with #80 or #120 sandpaper to a somewhat suede finish. Take about 50% of the shine off. Block sand in a diagonal direction and roll the block to follow the contour of the wing. Avoid short back and forth motions, they can result in flat spots. Sand both of the wings on both sides.

The die cut servo bay is a cookie cutout in the shape of a servo. The cutouts are not easy to see on the wing cores. Look at the beds to see where they are. Poke a finger while inspecting the top helps locate the servo cutout. Push the cookie about halfway out through to the bottom of the wing.

The shape of the cutout indicates the orientation of the servo. Push the servo into the cutout forcing the cookie half way out to the bottom side of the wing. Adjust the servo so that it is flush with the top of the wing and the foam cookies is snug against the other side of the servo.

A sharp kitchen knife or a long razor knife works well to make a flush cut. Another method is to mark the perimeter of the cookie with a pencil. Remove the cookie from the wing and make the cut and replace the cookie. Push the cookie from top to bottom of the wing about 1/4 inch. Apply a small amount of adhesive on two sides of the cookie and push the cookie back in place. Refit the servo to make sure that it is flush with the top surface of the wing.

Put the bottom beds together on a flat surface. Spray a mist coat of #77 on the center of the beds. A mist coat is one spray pass from 12 inches from the material. Let the glue dry for 5 minutes or until it will not come off when on a finger when touched. Use the battery bay cutout to align the beds. Use fiber filament tape to join the beds together. Spray and tape the top beds together the same way.
Use the plastic squeegee to direct as much adhesive over the spar. Scrape the length of the spar to remove any remaining adhesive from the wing. Scrape and wipe the squeegee until no more adhesive comes off. Lay the top beds on a flat surface and cover them with clear food wrap to prevent the wings from sticking to the beds. Repeat the carbon fiber gluing procedure on the top side. **TIP:** A sprinkle of talc such as baby powder over the glued area will keep the wing from sticking to the beds.

Glue the carbon fiber spars in the bottom side first. Lay the top beds on a flat surface. Put the wing panels in the top bed bottom side up. Hold the spray head 2 inches from the spar slot. Spray one long puddle of #77 the length of the two spar slots.

Use a credit card or similar size piece of plastic as a squeegee to trowel the adhesive into the spar slot. Work the adhesive deep into the slots. Scrape off any adhesive remaining outside the slots. Be careful to avoid spraying or scraping glue in the battery bay cutout seams.

Lay two flat carbon spars on a piece of newspaper and spray them with adhesive. Starting at the battery bay, push the spars into the channel. Make sure that the entire spar is below the wing surface.

Make a slurry with the #77 by spraying about a 30 second half power close-up blast directly into the spray can cap or a small cup. Mix the slurry for a minute to evaporate some of the thinner. Spread the thickened slurry with a popsicle stick. Let the adhesive dry to the touch. Join the wing panels together. Put two pieces of fiber tape on the top to hold the wing panels together for an hour or until the glue dries. Remove the die-cut battery bay plug.
INRUNNER ASSEMBLY

Do not remove the prop cutout. Some glue can be pushed into the separations to keep the part in place. The inrunner motor uses the formed motor mount and the small 5" diameter prop.

The shape of the aluminum formed motor mount matches the shape of the wing. Make a mark in the center of the motor mount. Measure and mark the center of the 18 inch plywood spar. Align the center marks in the middle of both parts.

Press the aligned parts together. Trace the entire outline of the motor mount onto the plywood spar with a pencil.
INRUNNER ASSEMBLY

Use a straightedge to extend the top line of the mount to the end of the plywood spar. Remove the wood outside of the outline from the top and bottom of the spar. Do not cut off the 2 inches on either end of the plywood spar.

Sand and fit the plywood spar until it matches the shape of the motor mount. Inspect the top and bottom for a flush fit. Put the wing in the bottom beds. Fit the parts in the spar channel of the wing before gluing them together. Notice that the spar channel cutout is shaped to fit the motor mount and plywood assembly. The center line of the motor mount and the plywood spar should match the centerline of the wing. Apply masking tape to the outside of the mount to protect the surface inside of the prop cutouts from glue.

Mask off the inside of the motor mount to prevent the holes from getting fouled. Lay the motor mount on a piece of newspaper. Spray a medium coat of #77 adhesive on the contact surfaces of the motor mount and the plywood spar. Let the glue dry to the touch. Align and assemble the mount and the plywood. Leave the masking tape in place till the next step. Make a slurry in the spray can cap or a small cup. Apply the slurry inside of the spar channel cutout with a popsicle stick.

Spray both sides of the motor mount assembly that are not covered by masking tape. Put the mount assembly into the channel before the glue dries. Spray a mist coat of adhesive on the center section and let it dry for a few minutes. Remove the masking tape. Apply some fiber tape across the spar channel to keep the foam against the motor mount assembly. Repeat the taping on the bottom of the wing. These pieces of tape will remain in place as permanent reinforcement.

Squeeze the center section tight against the mount assembly. Wrap two pieces of fiber tape around the motor mount assembly from top to the bottom. One on either side of the center line. These pieces of tape may be removed after a few hours when the glue dries.
OUTRUNNER ASSEMBLY

Round the corners of the 6 1/2” X 5” styrene battery bay floor. Center the finished part over the battery bay cutout and make marks for positioning on the bottom side of the wing. Apply some glue inside of the positioning marks on the foam. Lay the finished part on a piece of newspaper and spray a mist coat of #77 adhesive. Let the glue dry for a few minutes. Align the glued side of the floor with the position marks and press it in place.

**Tip:** The edges of the outside of the floor can be feathered to make a smooth transition when taped in place.

Spray a mist coat to the outside of the battery bay floor and let it dry for a few minutes. Cover the floor with fiber tape. Extend the tape 2 inches beyond the width of the floor.

The outrunner motor uses the flat motor mount and the larger diameter prop. The Pre cut prop cutout expander break-off should be removed. This portion can be broken off or cut with a razor knife for a cleaner finish.

Make sure that the “Zijji” cut in the middle of the motor mount is readable forward and the countersink cutouts are on the other side. The shape of the motor mount matches the shape of the wing. Measure and mark the center of the 14 inch flat motor mount. Measure and mark the center of the 18 inch plywood spar. Align the center marks in the middle of both parts.

Press the aligned parts together. Trace the entire outline of the motor mount onto the plywood spar.
OUTRUNNER ASSEMBLY

Use a straightedge to extend the top line to the end of the plywood spar. Remove the wood outside of the outline from the top and bottom of the spar. Do not cut off the 2 inches on either end of the plywood spar.

Sand and fit the plywood spar until it matches the shape of the motor mount. Inspect the top and bottom for a flush fit. Put the wing in the bottom beds. Fit the parts in the spar channel of the wing before gluing them together. The word “Ziji” should read correctly. Notice that the spar channel cutout is shaped to fit the motor mount and plywood assembly. The center line of the motor mount and the plywood spar should match the centerline of the wing. Apply masking tape to the outside of the mount to protect the surface inside of the prop cutouts from glue.

Mask off the back side of the motor mount to prevent the countersink holes from getting fouled. Lay the motor mount on a piece of newspaper. Make sure that the word “Ziji” reads backward on the surface to be sprayed. Spray a medium coat of #77 adhesive on the motor mount and the plywood spar. Let the glue dry to the touch. Align and assemble the mount and the plywood. Leave the masking tape in place til the next step. Make a slurry in the spray can cap or a small cup. Apply the slurry inside of the spar channel cutout with a popsicle stick.

Spray both sides of the motor mount assembly that are not covered by masking tape. Put the mount assembly into the channel before the glue dries. Spray a mist coat of #77 on the center section and let it dry for a few minutes. Remove the masking tape. Apply some fiber tape across the spar channel to keep the foam against the motor mount assembly. Repeat the taping on the bottom of the wing. These pieces of tape will remain in place as permanent reinforcement.

Squeeze the center section tight against the mount assembly. Wrap two pieces of fiber tape around the motor mount assembly from top to bottom. One on either side of the center line. These pieces of tape may be removed after a few hours when the glue dries.
Spray a light coat of adhesive on all top surfaces of the wing including the areas covered with fiber tape to prepare the wing for color taping. Make sure to spray the tips and trailing edges. Spray 2 inches of the bottom of the wing at the trailing edge because the first strip of tape will wrap around the trailing edge. Let the adhesive dry for 20 minutes. Put the wing top side up in the bottom beds. Put a weight on the left panel to hold it steady while taping. Start taping with color tape at the trailing edge and work forward.

The first strip of tape is wrapped around the trailing edge (TE) from top to bottom, being careful to follow the shape.

Covering the top and bottom of the wing in contrasting colors makes the plane much easier to fly. Use the darker color on the bottom surface. An optional roll of color tape will be required.

Apply strips of tape working forward from the TE. Overlap each strip of tape a quarter of an inch. Extend the tape two inches beyond the center line of the wing. Extend the tape two inches beyond the tips.

The fiber tape will not appear as dark as pictured here. Darker tape was used in these pictures to enhance contrast visibility to illustrate the tape diagram.

Apply a piece of fiber filament tape straight across center section of the wing between the carbon spars. Apply two side by side strips of fiber tape across the nose starting from the battery bay. Wrap one inch of tape around the leading and trailing edge to the opposite side. Repeat this pattern on the bottom side.

Start the color taping in the center of the wing by applying a strip of color tape in the center of the wing in front of the motor mount. Cut the tape 14 inches long; as long as the aluminum motor mount.
Continue overlapping the strips of tape until the entire top right wing panel is covered. Extend the tape over the battery bay and servo cutouts.

Trim off the tape that extends beyond the leading edge (LE.) Cover the left top side of the wing.

Trim and fold the at the prop cutout around to the bottom.

Trim and fold the around tape around the wing tip.

Trim and fold the tape into the battery bay.
Spray a mist coat of #77 on the bottom of the wing. Let the glue dry for a few minutes. Begin covering with tape from TE to LE with the same pattern as the top. Start the first strip at the TE. Complete the color tape covering on the bottom of the wing working from TE to LE. Cover the wing panels one at a time. Trim the panels before going on to the other side.

Locate the corners of the servo bay. Cut an “X” shaped pattern in the color tape from corner to corner. Fold the tape into the servo bay to the contour of the servo bay walls and bottom surface.

Trim the tape at the tip so that it overlaps the tape from the top.

Trim the tape at the prop cutout so that it overlaps the color tape at the top of the wing.

When the entire top and bottom are covered, wrap a spanwise strip of color tape around the LE.
Position the elevon with the 90 degree surface down. Hold the elevon against the TE. Make a mark to match the wing tip. Trim the end of the elevon to match the angle of the wing tip.

Sand a 45 degree angle into the front of the elevon. Sand the elevons and smooth all the surfaces. Spray the elevons with any spray enamel. Apply a light coat of paint and immediately wipe it with a cloth before it soaks in and dries. Let the paint dry.

For rough duty, the elevons may be covered with color tape.

Position the elevon on the trailing edge of the wing. Align a straight-edge with the wing tip. Leave a 1/16" space between the end of the elevon and the straight edge. Use small pieces of masking tape to hold it in position temporarily. Best to leave a corner of the tape turned up for easy removal.

Measure 1/2 inch from the leading edge of the top of the elevons and make a mark. Mask off the elevon leaving the half inch exposed. Spray a light coat of adhesive only on the top. Let the glue dry to the touch.

Hold the elevon at an angle against the TE of the wing. The angle will assure free movement of the elevon in the down elevon direction. Press the hinge tape to the wing in two places and check the travel in both directions. The elevon will only be required to move 3/4" from center. Press the hinge tape down along the length of the elevon with a squeegee.
The Zagi servo bay was designed to fit the Hitec HS-81 servo. The HS-81 is a moderately priced readily available servo with more than adequate torque. The servo bay may be expanded or shimmed to fit a different size servo. Since the servos are mounted so close to the center of gravity (CG), different size servos may be used without effecting the balance. Find the straight control arm with two tabs in the parts bag supplied with the servo.

Cut one of the tabs off of the control arm leaving only one tab.

If the servo is supplied with a four tab (X) shaped control arm, remove three of the tabs leaving only one.

Replace the round servo control arm with the modified arm. Avoid stressing the gears by holding the control arm to limit travel when removing and replacing. Do not over tighten the screw; snug is tight enough. To maximize servo life, avoid moving the servo control arm with the radio off.

The servos must be centered with the radio powered up before installation. **Do not hookup or install the motor now!**

Computer radios have settings for elevon mixing. Check the radio manual for flying wing, elevon or delta mix setting. V-tail settings will not work. Set the transmitter for elevons and determine the appropriate receiver slot for the controls. Position the servos the way they will be in the wings. Plug the right and left servos into the receiver (RX). Plug the three wire ribbon connector from the ESC into the throttle slot of the receiver, not the battery slot. The receiver is powered by the ESC. No separate receiver battery is necessary.

The trim levers are located on the transmitter to the left and below the control stick. Some trim controls are electronic and others are mechanical. Trim levers are provided for in-flight adjustments to achieve level flight. It is important to set the trim levers at the zero or center position. Set the motor control to the “Motor off” full down position. Turn the ESC switch off.

**Do not plug the motor into the ESC or install the prop yet!**
Before installing any of the electronics, layout the receiver (RX), battery, servos and ESC in the configuration that they will be in the airplane. Layout the components as shown making sure to align the servos with the lead wire and the control arm toward the back. The top of this picture is the nose of the airplane. The servo bay cutouts in the wings show the servo orientation.

Always power up the transmitter before plugging in the airplane flight battery. Always check the battery condition indicator on the transmitter to make sure that the battery is charged. Make sure that the throttle is in the full down (off) position.

The motor should not be attached to the ESC at this time. The motor will be tested and run when it is bolted to the motor mount and without the prop installed. Remember that the potential energy of this power system will turn the prop at 22,000 rpm and propel this airplane over 85mph. Plug the ESC into a charged battery. The male and female connectors have a polarity lock. They will only mate in one position, make sure the wires match: red to red and black to black.

Center the trim levers on all of the controls. With the radio on, inspect the servos to see that the control arm is at 90 degrees to the servo case in the hands-off neutral stick position. Adjust the control arm by removing and replacing it at 90 degrees to the servo case. Only use the trim lever to make in-flight trim adjustments.

Figure A and B are illustrations of the motion of the same control stick being moved in two different directions. When the elevon control stick on the transmitter is pulled back, (figure:A), the servo control arms should both move forward. This motion will move both of the elevons up. When the stick is moved to the right, (figure:B), the right servo control arm should move forward and the left servo control arm moves back. This opposed motion will move the right elevon up and the left elevon down.
Using a straight edge as a guide, make a half inch deep cut for a servo wire channel. The channel goes between the servo wire, where it exits the servo, to the middle of the receiver bay. Push the servo wire into the channel with a flat blade screwdriver. A cleaner installation can be made by drilling or burning a hole between the servo bay and the electronics bay. Burning a hole can be done with a heated wire. Practice on scrap foam.

Hold a straight edge against the outboard side of the servo control arm and parallel to the center line of the wing. Make a mark on the elevon. That mark will indicate the center line of the control horn.

Center the control horn on the mark on the elevon. Aim the blade of the control horn directly at the servo control arm. Use a punch or any pointed tool to mark the position of the holes in the control horn foot. Drill two holes big enough for the 2 x 56 self tapping machine screws. Thread the machine screws through the elevon into the nylon locking pad. Snug the screws to make a slight impression in the balsa wood. Do not over tighten!

Screw the threaded clevis onto the control rod so that equal threads are showing on both sides of the clevis threads. Hold the elevon in a slightly up position and make a mark where the control rod matches the holes in the control arm.

The diameter of the control rod may be reduced with a file or belt sander to fit better into the control arm. The control arm hole may be enlarged with a drill or by spinning an X-Acto blade in the hole.

Attach control rods to the servo control arms with a Z-bend. (NOTE: Z-bend pliers may be purchased from your local hobby dealer to make this operation easier.) Long nose pliers will also work to make a Z-bend.
Put a piece of fiber filament tape through the winglet slot to the top of the wing and wrap it around to the bottom of the wing. Add two more pieces of tape to secure the winglet in place. Make sure that the elevon will not bind against the winglet as it moves. The winglets are at the very back of the airframe where excess weight is a real balance factor. The tape method of fastening is both light and strong. If a different winglet fastening system is preferred, keep the weight down to the weight of two short strips of tape.

Locate the three inch hook side Velcro strips in the parts bag. Center the strips 1 inch apart on the battery bay floor. Center the loop side of the Velcro on the battery. The battery may now be mounted anywhere along the length of the battery bay depending on the desired center of gravity (CG). Plug the right and left servos into the Receiver. Make sure that the servos are replaced the same as the earlier test on page 15.

Drill a hole in the wall at the rear corner of the battery bay at an angle to miss the floor plate. Make the hole big enough for the antenna wire to fit through. Push the wire through leaving a couple of inches of antenna in the battery bay for positioning. Using a straight edge as a guide, make a quarter inch deep cut in the wing surface for an antenna wire channel. Cut the antenna wire channel to the end of the carbon spar then circle back about an inch from the first channel. Push the antenna wire into the channel with a flat blade screwdriver. Do not shorten the antenna wire. The antenna wire length is tuned to the transmitter.

Cutout the styrene parts along the cut lines. A hinge can be made for the hatch with fiber tape on one side. Use a strip of tape on the other side of the hatch to keep it shut for flight. The exit fairings can be taped over the servos with clear tape. Place the exit fairings over the servo. Power up the radio and move the stick to the limits to make sure that the control arm does not rub the fairing. Tape the exit fairing in place and repeat the test.

Mechanical centering of the elevon can be achieved by removing the clevis from the control horn and screwing it in or out.
Adjust the zero setting of the elevons. Unplug the three motors wires from the ESC. Turn the transmitter on and then the receiver. The initial trim settings should be adjusted holding a straight edge against the bottom of the wing at the TE. The elevon should be flush with the bottom of the wing for the last three inches. Use the threaded clevis to adjust them to the proper position. Do not use the trim levers on the transmitter.

Adjust the throw settings of the elevons. Unplug the three motors wires from the ESC. Turn the transmitter on and then the receiver. Set the wing on a couple rolls of tape or anything that will let the elevons move freely. Hold a ruler near the elevon. Pull the elevator stick back to the full up position without any right or left movement. The throw should be 3/8". The full down throw should be the same. Push the stick to the full right position. The right elevon should move up and the left move down. The throw should be 3/8".

Cutout the exit fairings along the cut lines. Make sure that the back of the fairing is completely opened. Fit the fairing over the servo with the radio system on. Hold the fairing in place and move the stick in all directions to make sure that the control arm and push rod do not make contact inside of the fairing. **TIP:** Wait until the airplane has been flight tested and trimmed before installing the exit fairings.
**Features and Operating instructions for the Zagi-25 and Zagi-35 Brushless ESC**

- No complex programming in auto adapt work mode
- Zagi-25 25A ESC continuous (33A surge)
- Zagi-35 ESC 35A continuous (43A surge)
- Microprocessor controlled
- Thermal protection (100°C) 212°F
- High voltage protection. The ESC is disabled when voltage is over 15V
- Up to 12 cells NiMh-NiCad or 2-3 Li-Poly
- BEC 2A Support 2-4 micro servos
- Runs motor in forward or reverse by swapping any two of the three motor wires
- Auto shut down when signal is lost or radio interference becomes severe for more than 3 seconds
- After radio connection has been reestablished, moving the throttle off can restart the motor
- Low voltage cut off factory pre-set at 8V for 3 cell Li-Poly battery pack

**Although the Zagi-25 and Zagi-35 ESC are programmable, they have been factory set for optimum efficiency for the Zijji inrunner and outrunner using a 3 cell Li-Poly battery pack.**

- Programmable low voltage cutoff
- Programmable startup types (very soft, soft or fast)
- Programmable cutoff types, (soft cutoff or hard cutoff)
- Programmable brake types (disabled, soft and hard)
- Programmable time advance (low, middle, high and auto)
- Programmable governor mode (low rpm governor or high rpm governor)
- Programmable current limiting (very sensitive, standard, insensitive or disabled)
- Programmable switching rate (the factory set default rate is for brushless motors) Changing the switching rate will cause the motor to overheat without any increase in performance. Changing the WPM will void the warranty on the motor and ESC.

**First time motor power-up**

First time powerup should be done outdoors. The following steps are provided for a safe first time motor power-up. Do not install the prop onto the motor shaft yet. Never install the prop when the motor is plugged into the battery and the ESC is armed. Test the motor hookup before the prop is installed. Make sure that the battery is charged. The batteries are not shipped with a charge.

**NOTE:** Always turn the transmitter (TX) on before connecting the battery and disconnect the battery before turning off the TX.

![Diagram showing ESC status and possible issues](image1.png)

Remember to listen to the ESC when the battery is plugged in.
The Zagi-ZG will balance with the elevons in an almost neutral position. The Zagi airfoil has some reflex. The suggested starting point for balance is 8 inches back from the nose. The best way to find the balance point is to keep moving the battery back, between flights in 1/8" increments until it is almost unflyable (too elevator sensitive). Remember, the elevator throw can compensate for over sensitivity.

Install the prop for balance purposes only. Do not connect the battery at this time. Lay the wing bottom-side-up. Tape a 1/4" dowel 8 inches back from the nose. A round pencil or ball-point pen can be used. Place the wing right-side up on a flat surface. Balance is achieved when the wing balances momentarily on the dowel. Move the battery forward or aft to balance.

When balance is achieved, cut a foam shim the size of the space between the battery and the front of the battery bay. The shim can be taped or glued in the battery bay in front of the battery. If different size and weight batteries are going to be used, the wing must be balanced with each different weight battery. Balance the wing with each different battery and make a shim for each battery. Tape the shin to each battery.

A simple hatch hinge can be made with 1 inch pieces of fiber tape applied to both sides of the left side of the styrene hatch.

If the Zagi-ZG requires reflex (up elevator) for level flight it is nose heavy. The weight in the nose pushes the nose down. The elevons compensate in the up elevator position creating drag.

The Zagi-ZG will balance with the elevons in an almost neutral position. The Zagi airfoil has some reflex. The suggested starting point for balance is 8 inches back from the nose. The best way to find the balance point is to keep moving the battery back, between flights in 1/8" increments until it is almost unflyable (too elevator sensitive). Remember, the elevator throw can compensate for over sensitivity.
1. Remove the prop and make sure that the motor is seated and securely attached to the motor mounts.

2. Make sure that the reverse switch for the motor stick on the transmitter is in the normal position. Not reversed!

3. Push the motor control stick on the transmitter to the full off position.

4. Center the motor control trim lever (if the TX has a motor trim lever).

5. Turn the transmitter power on. Check the output meter for battery condition.

6. Secure the charged battery in place with the Velcro tabs.

7. Check that the ESC signal lead (the flat 3 wire bundle) is in the motor slot of the receiver.

8. Position yourself with the nose of the airplane pointed at you.

9. Plug the ESC into the battery. A seven tone sequence means that the ESC is armed.

10. Move the motor control stick to the full on position. The motor should turn counter clockwise when observed from the front.

11. Unplug the battery from the ESC. Install the prop onto the motor shaft so that the leading edge is turning as indicated below. The leading edge of the prop is the straighter side of the prop. Tighten the set screws or nut to secure the prop hub to the shaft. Rotate the prop to make sure that it is clear of any obstructions.

12. Position yourself with the nose of the airplane pointed at you. Make sure that the prop can turn freely in case of sudden start when you plug the ESC into the battery. Keep hands away from the prop at all times when it is armed. Motors have been known to start running from a radio glitch.

13. Plug the ESC into the battery. You should hear 7 tones. Hold the airplane securely with one hand and the transmitter in the other. Aim the motor in a safe direction and move the motor control to the full on position. The motor should turn counter clockwise when observed from the front. The prop will make a wooshing sound if it is installed wrong. Do not run the motor more than 30 seconds while holding it in your hand or on the bench. The motor and ESC must have forward motion to cool.

14. Unplug the battery from the ESC before you turn the transmitter off. Never disconnect the ESC with the motor running!
Preflight check and glide test

Do a preflight check before every flight. Always turn the transmitter power on before the motor battery in the airplane is plugged in. Make sure that the throttle control stick is in the full down position. Make sure that the controls are working properly. Check the trim levers on the transmitter. Pull the elevator control stick back and observe that both elevons move upward. Push the control stick to the right and observe the right elevon moves up and the left elevon moves down. Hold the wing securely by the nose. Move the throttle stick to the half throttle position momentarily. The first glide test should be done on flat land in a light breeze. The wing should be held by the nose with your palm up over your head and your thumb wrapped around to the top. Hold the wing over your head with the nose pointed straight ahead. Run slowly into the wind. Give it a gentle push STRAIGHT AHEAD. Do not point the nose upward. Correct the flight path with the radio control stick. The test is successful when the wing flies straight ahead with a slow sink rate to a sliding landing. If the wing turns in either direction after the launch, compensate by adding 2 or 3 clicks of trim in the opposite direction. If the wing pitches up and immediately dives, add 2 or 3 clicks of down trim. Repeat the glide test until the Zagi Tazz flies straight ahead with a slow sink rate to a sliding landing. Increase the launch speed each time to provide longer control flights.

First flight

Check the frequencies (channel number) of all pilots within visual range before turning on your transmitter. Turning on your transmitter with the same channel number as someone who is flying will cause his plane to crash.

The Zagi Tazz is capable of high speed. Flights at a high rate of speed can cause considerable damage to someone or something if a collision occurs. Please exercise caution while flying. It is recommended that you join the Academy of Model Aeronautics (AMA) at 1-800-435-9262 to provide insurance, awareness of safe flying practices, and knowledge of what’s going on in the modeling field. At some flying sites it is mandatory that you be a member of the AMA.

Do not launch the Zagi Zijji with the motor running. Hold the wing by the nose with your palm up over your head and your thumb wrapped around to the top. Take a step or two forward and give the wing a good strong throw into the wind. A follow through with a little finger tip will increase the launch speed. Slide the throttle stick to the full forward position when the Zagi Zijji is a comfortable altitude and experiment with some throttle settings. Full motor is fun but will use up the battery quickly.

If the BEC cutoff occurs before you land, you may restart the motor and use low throttle if necessary by moving the throttle stick all the way down (to the brake position) and then throttling back up. BEC cutoff will occur again if the voltage drops too low.

Good luck,

JT
Buying any Trick R/C lithium polymer battery pack is assuming a responsibility to learn safe handling, charging and discharging for personal safety. Trick R/C makes the highest quality and safest lithium polymer packs available. Trick R/C also provides instructions to safely check and charge the batteries. A multi connector is built-in for cell balancing and charging. The responsibility of the user is to read, learn and use the recommendations and safety features provided by the manufacturer.

An important consideration for owning and using electric powered models with lithium polymer battery packs: A watt meter is the most important tool for the electric flyer. So get a watt meter. A watt meter makes it easy to match the prop to the ESC and the safe discharge rate of the battery.

It should be noted that in R/C applications, special care must be taken in their use. While much more volatile than nickel cadmium or nickel metal hydride batteries, lithium polymer batteries can be safely recharged hundreds of times over if one follows the guidelines below:

* Chargers designed for use with Li-Po batteries must be used. Failure to do so runs the risk of explosion and/or fire.
* The leads must never be allowed to short together. Immediate damage to the Li-Po will result.
* Unlike nickel-cadmium, Li-Po batteries must never be allowed to discharge below a certain point. Therefore, low voltage cutouts ESCs or ESC/ receiver combinations must be set so as not to over discharge.
* A model involved in a severe crash should never be immediately loaded into a vehicle due to risk of fire.

Safe Charging: The majority of lithium battery fires happen during charging, so it makes sense to charge where a fire will not spread.

* Do not charge inside a vehicle, especially a moving vehicle.
* Charging in a heat-resistant ceramic container with a loose fitting lid is recommended. Flames, smoke and gas are released if a battery "vents."
* Metal containers can be used, but ensure the charging wires cannot be cut or shorted.
* Keep batteries separated so that a fire cannot damage other batteries.
* The charging container should be a short distance away from anything flammable. There is a commercially available safety device called a ‘Battery Bunker’. This device is a fire proof box to hold li-poly batteries for home storage and transporting them to flying sites.

Balancing: Many batteries, especially the larger packs now come with a second, smaller, multiwire plug for balancing. A lithium balancer can be plugged into this either during charging or afterwards to ensure that all cells are at the same voltage. If a battery is not balanced, some cells may be overcharged, others may be over-discharged and the life of the pack can be reduced.

Short circuit: Polymer packs have enough potential energy to melt the wires and connectors. Short circuits will also generate high currents which may cause electrolyte leakage, gassing and/or explosion.

Mechanical shock: Polymer cells have much less mechanical endurance than standard metal can cells. Following a crash or other mishap, the pack should be examined and isolated in a fire safe place for observation. Internal damage does not always appear immediately.

Temperature range: The highest temperature polymer cells can tolerate is 140F (60C). Mount the battery pack in position to maximize airflow for cooling. The maximum discharge rating does not mean that the maximum discharge can be maintained for the full discharge cycle of the pack. The maximum current can be in bursts of 30 seconds and not to exceed 30% of the discharge cycle. Never exceed 140F is the more important limit to consider. Avoid storage in a hot temperature environment. In the trunk or under the windshield of a car can create extensive heating on the cells or packs. This extreme heating will cause the cells to swell. Once cells swell they will not recover from this condition. Do not attempt to charge swollen cells.

Tampering or disassembling of packs: Tampering or disassembling and cell replacement within a pack will void the warranty unless performed by authorized Trick R/C technicians.

Damaged cells or packs: In the event of a crash. Inspect the battery, wire leads and connections for possible short circuit. Inspect the battery pack for dents and ruptures in the foil. Make sure that none of the electrolyte is leaking. Do not use the pack again if any of the cells are dented, deformed or leaking. If there is any doubt cut all wires from the cells and pack. Cut wires one at the time to avoid a short circuit.

Disposal of polymer cells: If a battery's outer case is punctured, the lithium inside is highly volatile and will react violently with water. Such a pack may be disposed of by first discharging it with an automotive lamp, carefully slitting the outer skin of each cell with a razor blade or X-Acto knife and neutralizing it for several hours in saltwater. Since the chemicals are considered environmentally friendly, the pack may then be disposed of in the regular trash. Note that some cells might react to any discharge attempt with further bloating. Such cells should immediately be placed into a saltwater bath. It can take several days for a fully charged cell to deactivate in saltwater. If your cell is bloated, exercise caution when opening the outer foil. Using a needle on a stick is advised. Only puncture the outer skin, do not put the needle all the way through the cell. It is advised that this should happen with the cell already submerged in the saltwater bath. Discard cell/pack in the trash.
Batteries are rated according to the potential energy capacity; how much energy from a charger can the battery pack store. The capacity is rated in milliampere (mAh). There are 1000 mAh in one amp. So a 2500 mAh battery is 2.5 amps. The “C” rating is the discharge potential of the battery; how big an amp load can the battery safely handle. A battery pack rated at 15C means that the discharge potential of the battery pack is 15 times “C” the capacity. If the capacity is 2.5 amps and the discharge rating is 15C than (2.5 X 15 = 37.5 amps) That means that 37.5 amps is the maximum continuous discharge load. Some battery packs display two “C” or discharge ratings: (15C/25C). The first discharge rating, 15C (37.5 amps) is the continuous maximum load rating and the second discharge rating of 25C (62.5 amps) is the maximum momentary burst or spike load discharge rating.

Lithium polymer cells have very strict charging requirements.

Always use chargers specifically designed for lithium polymer cells or packs.
Always test your charger to assure it is functioning properly.
Always charge your lithium polymer cells or packs in a low fire risk area or a fire proof container.
Always store lithium polymer packs in a fire proof container.
Always have sand or dry fire extinguisher handy in the event of fire.
Always handle lithium polymer cells and packs with great care.
Always purchase a factory authorized built pack instead of building your own.
Always observe the correct polarity when connecting cells or packs to charger or application.
Always seek medical attention if electrolyte gets in your eyes (flush with cold water immediately).
Always scrub with soap and water if electrolyte comes in contact with your skin.

Never charge lithium polymer cells or packs unattended.
Never charge lithium polymer beyond factory specifications.
Never charge lithium polymer inside your car, home or garage or where other physical damage can occur.
Never charge lithium polymer while in the application as the hot pack may ignite certain materials.
Never charge lithium polymer on flammable materials such as wood, foam or plastic.
Never extinguish a lithium polymer fire with water.
Never disassemble a lithium polymer cell or pack.
Never short circuit lithium polymer cells or packs.
Never use a lithium polymer cell or pack that has been damaged (see Damaged notes below).
Never keep cells or packs in temperatures that exceed 60C/140F.
Never exceed the factories maximum specified discharge rates.
Never combine different sizes packs or capacities together in parallel.

Trick R/C guarantees the battery to be free from defects in both workmanship and material at the date of purchase. This does not cover any components or parts damaged by use, misuse or modification. In no case shall Trick R/C’s liability exceed the original price of the purchased kit.

Since Trick R/C has no control over the final assembly, no liability shall be assumed for any damage resulting from the use by the user of the final user-assembled product. By the act of using the final user-assembled product, the user accepts all resulting liability.

Trick R/C lithium polymer batteries sold by Trick R/C Products LLC are approved only for the radio-control market. Use in any other application is not permitted without prior approval. Charging, discharging, use for electric motors and flying models may cause serious personal injury or property damage. In purchasing/using Trick R/C polymer batteries, the buyer/user, agrees to accept all responsibilities of these risks and not to hold Trick R/C, its distributors or retailers (including all owners and employees) responsible for any accidents, injury to persons, or damage to property. Since many radio-control applications exceed the manufacturer's recommended maximum discharge rates there is no warranty (expressed or implied) by the manufacturer, its distributors and retailers in respect to the cycle life, capacity, cell characteristics or storage of cells/packs used in the radio-control market.

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